

Claims

[c1] What is Claimed is:

1. A three dimensional Triple Gate (Tri-gate) device comprising:
a composite fin structure consisting of a silicon germanium core and a strained silicon epitaxy layer grown from surface of said silicon germanium core;
a gate strip wrapping a portion of said composite fin structure, wherein portions of said composite fin structure not covered by said gate strip constitute source/drain regions of said Tri-gate device; and
a gate insulating layer interposed between said composite fin structure and said gate strip.

[c2] 2. The Tri-gate device of claim 1 wherein said composite fin structure has a substantially flat top surface and vertical sidewalls.

[c3] 3. The Tri-gate device of claim 2 wherein said composite fin structure has a width of said flat top surface that is approximately equal to its height.

[c4] 4. The Tri-gate device of claim 1 wherein said strained silicon epitaxy layer has a thickness of about 50~300

angstroms.

- [c5] 5. The Tri-gate device of claim 1 wherein said gate strip is made of polysilicon or metal gate.
- [c6] 6. A Tri-gate device comprising:
a composite fin structure consisting of a semiconductor core and a strained epitaxy layer grown from surface of said semiconductor core;
a gate strip wrapping a portion of said composite fin structure, wherein portions of said composite fin structure not covered by said gate strip constitute source/drain regions of said Tri-gate device; and
a gate insulating layer interposed between said composite fin structure and said gate strip.
- [c7] 7. The Tri-gate device of claim 6 wherein said semiconductor core has a first lattice constant that mismatching a second lattice constant of said strained epitaxy layer.
- [c8] 8. The Tri-gate device of claim 6 wherein said semiconductor core consists of silicon germanium.
- [c9] 9. The Tri-gate device of claim 6 wherein said strained epitaxy layer is a strained silicon epitaxy layer.
- [c10] 10. The Tri-gate device of claim 9 wherein said strained silicon epitaxy layer has thickness of about 50~300

angstroms.

[c11] 11. The Tri-gate device of claim 6 wherein said gate strip is made of polysilicon or metal gate.